

Draft LWG Background Data Methods Proposal

I. DATA SELECTION

a. Analytes

- Include major risk drivers as identified working with EPA
 - The list will need to be reconciled with other chemical lists related to the background purposes discussed more below (e.g., PRG chemicals, risk drivers, hill topping, recontamination analysis, RI mapping).
 - Fate and transport (and recontamination) evaluation requires an input value for individual constituents that are represented as totals elsewhere
 - Includes both anthropogenic and naturally occurring (i.e., metals) chemicals

b. Matrices

- Sediment
 - Primary line of evidence upriver bedded sediment (upstream of RM 15.3, upper end of Ross Island)
 - Secondary/corroborating lines of evidence
 - Sediment traps (RM 11 and 16)
 - Upstream borrow pit core intervals (RM 10.5 and 10.9)
 - Suspended solids in water column (RM 11 and 16)
 - Regional sediment quality data sets
- Surface Water
 - Primary line of evidence RM11/RM16 surface water (see spatial extent, below)
 - Secondary/corroborating line of evidence regional water quality data
- Tissue - not defined as background. Upriver tissue data only used for informational purposes in RI

c. Spatial Extent

- Bedded Sediment

- Use data from RM 15.3 through RM 26, and including data up to RM 28.4 (i.e., new EPA "Falls" data set)
- We do not yet fully understand the content of the new EPA upriver data set and appropriate incorporation needs to be evaluated
 - Sufficient level of QA (see data quality below)
 - Evaluate data above and below falls for differences due to break in physical system represented by the falls
- Surface Water and Sediment Traps RM 11 to approximately RM 16
 - Pool all data and evaluate removal of outliers due to any localized sources. Consider ability and limitations of removing effects of localized sources.

d. Data Quality

- Category 1 Level QA2 (i.e., risk assessment dataset)
 - Evaluate new EPA data (near falls) against this data level. EPA needs to validate this sufficiently to rise to this level (Cat 1/QA2) by June 1.
 - Regional datasets may also be of unknown/suspect quality
 - Will conduct general evaluation of overall data quality
 - Because it would be used as a secondary line of evidence, lesser data quality may be acceptable

II. DATA PROCESSING

a. Treatment of Replicates/Duplicates

- Exclude field replicate values, original samples only. (Note: this is consistent with previous ecorisk, but not human health methods.)

b. Calculation of Analyte Totals (e.g., total PCBs)

- Use risk assessment summation methods
 - Non-detects for analytes detected at least once are included in the summation at $DL=1/2$.
 - Non-detects for analytes that were never detected within each dataset are not included in the summation (i.e., set to zero).

- If all analytes in a summed term were not detected, then the highest DL is applied as the reported ND value for the total, and the total is U qualified.

c. Identification of Outliers

➤ Sediment

- Assumption: Upriver bedded sediment data set (upstream of RM 15.3) is all representative of background
 - Sediment quality in the upriver reach (upstream of RM 15.3) is not influenced by contaminant releases in the study area or downtown reach and reflects natural and anthropogenic contamination levels characteristic of the upper Lower Willamette River watershed.
 - While ProUCL statistically identified from 0 to 4 *potential* outliers for the major risk drivers in the upriver data set, the locations of these potential outliers were geographically dispersed, interspersed with non-outlier samples, and not closely associated with limited potential sources (e.g., documented ESCI sites, bridge crossings).
- On this basis, applying best professional judgment to the assessment of the potential outliers, none are identified as actual outliers in the dataset within upriver bedded sediment.

➤ Surface Water and Sediment Traps

- Remove samples potentially influenced by localized sources based on best professional judgment
- Data set small, so primary tool will be visual analysis

d. Nondetect Value Substitution

- Per Helsel 2005 (*Nondetects and Data Analysis*); also in agreement with ProUCL guidance,
- $n_{det} < 6 \rightarrow$ Do not calculate statistics
- If $> 80\%$ ND, $n_{det} < 50 \rightarrow$ Do not perform substitution.
- If multiple DLs, any detection frequency, any $n_{det} (>6) \rightarrow$ Apply Kaplan-Meier (nonparametric maximum likelihood estimator) substitution to untransformed data

- If single DLs → Apply ProUCL recommended approach

III. USE OF PROCESSED BACKGROUND DATA SET

- a. Use consistent data set for all background purposes as defined by previous steps. Primary line of evidence is governing data set. Secondary lines of evidence used as qualitative support and reality check.
- b. For bedded sediments, calculate background values for hydrophobic chemicals on an Organic Carbon-normalized basis for bedded sediments (consistent with EPA Equilibrium Sediment Benchmark Guidance).
- c. Various potential purposes of background data were discussed with EPA in the recent background meeting and the relevant purposes recognized by LWG and EPA are detailed below. LWG technical team recommended statistics for each purpose are:

- PRGs

- Purpose Explanation: Background values provide a risk management benchmark for PRG levels.
 - Proposal: Use statistics that are based on the full distribution of the background data set, consistent with the concept that background-based remediation goals should be selected such that chemical concentrations in the study area and the upriver reach are similar. Applies to sediment and surface water.

- Risk

- Explanation: Background used for comparison purposes in risk characterization section of BLRA.
- Proposal: 95th upper confidence limit (UCL). Applies to sediment and surface water.

- Hilltopping

- Explanation: This is the process of identifying areas associated with sample stations that most contribute to the exceedance of a site-wide value. In this process, a "*replacement value*" must be assumed for those stations that are "removed" in the process. We need to discuss with EPA appropriate approaches for replacement values. Use of a background value is one potential approach. In addition, background may be the overall goal for the site on a SWAC basis, particularly when risk based levels are below background.

- Proposal: Calculate based on the distributional properties of the background data set. If background is also the site-wide goal, need to consider whether replacement values and goals should be selected on a consistent basis. Applies to sediment.
 - Long-term monitoring post remedy
 - Explanation: Background values are one possible metric of comparison against long term monitoring results after the remedy is complete.
 - Proposal: It is not necessary to determine these values at this time. We propose these be developed in the Long Term Monitoring Plan. However, it is important to recognize early that long term monitoring is a valuable component to any remedy. Applies to sediment and water.
 - Cap Material Selection
 - Explanation: Background levels could be one criteria for selection of capping material. The capping material chemical concentrations should not exceed background levels.
 - Proposal: 95th UCL. Applies to sediment.
 - Recontamination Analysis: The recontamination analysis in the FS would use background type values, but will also use other values not related to background. Thus, recontamination analysis is not really a background issue per se. It appears less confusing to leave recontamination analysis out of the "background purposes" list at this time.
 - Possible AOPC Mapping Thresholds – Additional purpose identified by LWG after last EPA PRG meeting.
 - Explanation: Background values and multiples of background levels could be used in mapping to provide color gradients in map concentrations. For example, 100x background is red, 10x background yellow, 2x background green etc. In some cases, use of background could avoid the use of highly uncertain or non-site specific Lines of Evidence or PRGs in preliminary AOPC mapping exercises.
 - Proposal: If EPA sees use in this approach, we will need to determine appropriate statistic for this purpose.
- d. **Site Baseline vs. Background** – The concept of within site "baseline" is fundamentally different than background levels. Per EPA guidance

background levels are not caused by CERCLA releases from the facility associated with the Site (in this case, the Portland Harbor Superfund Site). For this Portland Harbor Superfund site study, background could include input from upriver sources, hazardous substances from non-CERCLA releases impinging on the Site, and CERCLA releases from other sites upstream or adjacent to the Study Area (i.e., below RM 11.8). Consequently, for clarity, we propose keeping within site baseline determinations separate from "background" determinations. However, we see some value in using the baseline concept in the RI/FS for sediments.

- Calculate within site baseline using "knee of the curve" type analyses.
- Primary use of baseline would be to assist in AOPC identification by comparing site specific AOPC boundaries to surrounding areas that are at or near baseline levels.
- Do not use as a hill topping replacement value, because this ignores consistent approaches to determining long term remedial outcomes. For example, such an approach does not allow for long term processes that will be included in effectiveness evaluations of all FS alternatives.
- Include within site stormwater from open space and residential areas as part of baseline evaluation on a qualitative basis. Will be primarily handled in as part of the recontamination analysis.